

**CLAIMS**

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent is:

- 1 1. A method of measuring a stability of a plating bath, said method comprising:  
2 providing a plating bath having a known voiding threshold concentration;  
3 obtaining a bath liquor, possibly containing a void-formation marker (VFM) from  
4 said bath;  
5 determining a concentration of said void-formation marker; and  
6 maintaining said VFM concentration below said threshold concentration.
- 1 2. The method of measuring a stability of a plating bath, according to claim 1, wherein  
2 determining a concentration of said void-formation marker comprises:  
3 separating said void-formation marker from said plating bath liquor; and  
4 quantifying said void-formation marker.
- 1 3. The method of measuring a stability of a plating bath, according to claim 2, wherein said  
2 void-formation-marker is separated chromatographically.
- 1 4. The method of measuring a stability of a plating bath, according to claim 3, wherein said  
2 void-formation-marker is separated by liquid chromatography.
- 1 5. The method of measuring a stability of a plating bath, according to claim 3, wherein said  
2 void-formation-marker is separated by high performance liquid chromatography (HPLC).
- 1 6. The method of measuring a stability of a plating bath, according to claim 3, wherein said  
2 chromatography comprises ion-pairing, reversed-phase chromatography.

7. The method of measuring a stability of a plating bath, according to claim 2, wherein said quantifying is performed by instrumental analytical methods selected from the group consisting of spectroscopy and electrochemical detection.

8. The method of measuring a stability of a plating bath, according to claim 7, wherein said spectroscopy comprises techniques selected from the group consisting of ultraviolet, visible, infrared, and mass spectroscopy.

9. The method of measuring a stability of a plating bath, according to claim 2, wherein said quantitation is provided by instrumentation that provides a quantitative output in proportion to a concentration of said void-formation marker.

10. A method of measuring a plating bath breakdown threshold value, T, said method comprising:  
plating at least one metal on a substrate;  
determining a plurality of time-points;  
determining a VFM ratio for each of said time-points;  
counting, for each of said time-points, a number of voids in the metal plated on said substrate;  
determining said threshold value as the largest VFM ratio at which no voids are observed.

11. A method of measuring a plating bath breakdown threshold value, according to claim 10, wherein said VFM ratio is the said concentration of said void-formation marker divided by a concentration of an accelerator.

12. A method of maintaining a plating bath under non-voiding conditions, the method comprising the steps of:

- 3       determining a bath threshold value, T;  
4       determining a  $C_{VFM}$ ; and  
5       performing a bleed and feed to maintain said  $C_{VFM}$  below the value of said threshold.
- 1   13.   A method of maintaining a plating bath under non-voiding conditions, according to claim  
2   12, wherein said bleed and feed comprises the steps of:  
3       adding a volume of fresh bath liquor to bring the volume to a fractional volume above a  
4   nominal bath volume; and  
5       removing said fractional volume;
- 1   14.   A method of maintaining a plating bath under non-voiding conditions, according to claim  
2   13, wherein said fractional volume is from about 1% to about 10%.